Evolution of Quantum Teleportation Circuits with Improved Genetic Algorithm

Abstract

Quantum Teleportation is the process of transmitting Quantum information from one place to another by performing Quantum mechanical operations like entanglement, Bell measurement and classical communication. Unlike the commonly used term teleportation, Quantum teleportation involves only transfer of information rather than particles or objects.

Quantum teleportation allows transmission of quantum information despite the impossibility of measuring or broadcasting the information to be transmitted.

This paper evolved some new simpler Quantum teleportation circuits which use only Quantum entanglement and a set of Hadamard and CNOT gates. Further, each of the circuits performs teleportation even if Alice does not perform measurement on her qubits. Keeping the feasibility of physical realization in mind, circuits using only adjacent CNOT gates along with Hadamard gates have also been constructed. All these circuits have been evolved using Genetic Algorithms which has been designed with appropriate representation and search operations.
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towards faster convergence.

References

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28. Yabuki T and Iba H., 2000, Genetic algorithms for quantum circuit design - Evolving a simpler teleportation circuit. In Late Breaking Papers at GECCO,

Index Terms

Computer Science
Algorithms
Keywords

Quantum teleportation, Quantum circuit, Entanglement, Adjacent gates, Genetic algorithm.